

Attorney Docket No.: 5649.1168
Application Serial No.: 10/695,061
Filed: October 28, 2003
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REMARKS

This response is submitted in reply to the Office Action dated July 18, 2005 ("the Action"). Claims 1-7, 27-35 and 37-40 are pending in the application. Applicant hereby requests further consideration of the present application in view of the amendments above and the comments that follow. The claim amendment to Claim 37 is new and does not correspond to Claim 37 as presented in the non-entered After Final Amendment. Applicants hereby request non-entry of the non-entered After Final Amendment.

I. Allowed Claims

Applicants acknowledge, with appreciation, the Examiner's statement that Claims 1-7, 30 and 34 are allowed.

II. Advisory Action and Interview

Applicants wish to acknowledge the courtesy and attention provided by the Examiner in an After Final telephone interview conducted with the undersigned on October 11, 2005, in response to the Advisory Action. The Advisory Action refused to enter the original After Final Amendment, as the After Final Amendment did not place the application in condition for allowance and/or raised new issues that the Examiner opined would require further consideration. In the telephonic Interview, Applicants discussed the deficiencies of U.S. Patent No. 6,294,449 to Wu ("Wu") as applied to Claim 37 (as this argument was inadvertently omitted from the non-entered After Final Response).

In particular, Applicants noted that Wu discloses exposing the upper portion of the gate electrode (Figure 4) and performing thermal oxidation to form oxide layer 135 on the exposed gate electrode (*see* Figure 5). In Wu, the upper portion of the gate electrode is contacted by the oxide layer 135, not by a silicon nitride layer as claimed.

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III. The Drawing Objection and the Claim 40 Rejection

The Examiner objects to the drawings for failing to illustrate the bottom surface of the gate electrode contacting the semiconductor substrate as recited in Claim 40. To address this rejection, Applicants have amended Claim 40 above. Claim 40 now recites:

The self-aligned contact structure of Claim 37, wherein the silicon nitride liner contacts the self-aligned contact pad at the bottom portion of each gate electrode abutting an interior liner thereat to define a thicker covering at the bottom portion of the gate electrode than other parts thereof.

Accordingly, Applicants respectfully submit that the drawing objection and the rejection of Claim 40 has been obviated and as no art has been applied to Claim 40, Applicants submit that Claim 40 recites allowable subject matter. Further, Applicants respectfully submit that Claim 40 is also allowable as it depends from an allowable base claim, Claim 37.

IV. The Art Rejections

The Action rejects Claims 27-29, 31-33, 35, and 37-39 as being anticipated by or obvious based on U.S. Patent no. 6,294,449 to Wu ("Wu") or U.S. Patent No. 6,284,596 to Sung et al. ("Sung"). Applicants respectfully disagree with this rejection; however, in order to advance prosecution, Applicants have canceled Claims 27-29, 31-33 and 35 above without prejudice to pursuit of this subject matter in a future continuation application.

The Action states that Claims 37-39 are anticipated by Sung. Applicants respectfully disagree. Independent Claim 37 recites:

A self-aligned contact structure comprising:
two adjacent gate electrodes on a substrate, each gate electrode having a top portion narrower than a bottom portion and sidewalls;
a silicon nitride liner directly contacting gate electrode sidewalls and the top portion; and
a self-aligned contact pad between the adjacent two gate electrodes to be electrically connected to the substrate between the adjacent two gate electrodes, the self-aligned contact pad protruding from a top surface of each gate electrode.

Applicant respectfully submits that Sung fails to teach or suggest at least the emphasized feature noted above. The layer 170 of Sung includes an oxide and nitride (see, e.g., col. 7,

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lines 19-26). However, the specification also explicitly refers to layer 170 as an oxide layer (col. 7, lines 38-39 and col. 8, line 11, and lines 18-19).

Further, even assuming that the layer 170 includes both oxide and nitride in a final structure, the order of oxide and nitride (and its respective contacting relationship with the gate electrode) can be induced from the specification of Sung. For example, at col. 7, lines 20-24, Sung states that, "at the next important step, **conformal layers of oxide and nitride** are deposited over second polysilicon layer (160), then etched using a partial hard mask (175) as shown in Figure 2F. This layer (170) of nitride/oxide, which is shown only partially after the etch, is important" (emphasis added). Applicants submit that from this description, the oxide and nitride are sequentially stacked as conformal layers on the polysilicon layer (160) so that the oxide is the material that contacts the polysilicon (160).

Applicants submit that Claims 38-40 are patentable for at least depending from a patentable base claim. Applicants also submit that Claims 38-40 recite independently patentable subject matter.

Applicants have discussed the deficiencies of Wu and Claim 37 above and Applicants submit that Claims 37-40 are also patentable over Wu.

CONCLUSION

Accordingly, Applicant submits that the present application is in condition for allowance and the same is earnestly solicited. The Examiner is encouraged to telephone the undersigned at 919-854-1400 for resolution of any outstanding issues.

Respectfully submitted,



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CERTIFICATION OF FACSIMILE TRANSMISSION UNDER 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to the Patent and Trademark Office via the central facsimile number 571-273-8300 on October 17, 2005.


Rosa Lee Brinson